HATCHERY AND GENETIC MANAGEMENT PLAN (HGMP)

Hatchery Program:	Elwha River Summer /Fall Chinook
Species or Hatchery Stock:	Summer/Fall Chinook (Onchorynchus tshawytscha) Elwha River
Agency/Operator:	Washington Department of Fish and Wildlife
Watershed and Region:	Elwha River (Strait of Juan de Fuca) Puget Sound
Date Submitted:	, 2002
Date Last Updated:	August 20, 2002

SECTION 1. GENERAL PROGRAM DESCRIPTION

1.1) Name of hatchery or program.

Elwha River Summer/Fall Chinook

1.2) Species and population (or stock) under propagation, and ESA status.

Elwha Summer / Fall Chinook (*Oncorhynchus tshawytscha*), "threatened"

1.3) Responsible organization and individuals

Name (and title):	Manuel Farinas, Region 6 Hatchery Operations Manager Don Rapelje, Dungeness Complex Manager	
Agency or Tribe:	Washington Department of Fish and Wildlife	
Address:	600 Capitol Way North, Olympia, WA 98501-1091	
Telephone:	(360) 902-2714	(360) 681-8024
Fax:	(360) 902-2943	(360) 681-7823
Email:	**farinmaf@dfw.wa.gov**	**rapeldgr@dfw.wa.gov**

Other agencies, Tribes, co-operators, or organizations involved, including contractors, and extent of involvement in the program:

1.4) Funding source, staffing level, and annual hatchery program operational costs.

Originally, the program was funded, as a mitigation program, through the Elwha dam owners, the Crown Zellerback Paper Company, and then, in recent years, the new owners, the Diashowa Corporation. The ownership of the Elwha dams has now shifted to the federal government's Parks Service. The Bonneville Power Administration has agreed to provide mitigation moneys, via the Parks Service, for the operation of the hatchery from July 1, 2000 to June 30, 2001. The State and Federal government are currently in negotiations to resolve long-term funding issues.

1.5) Location(s) of hatchery and associated facilities.

Elwha Hatchery:	Elwha River (18.0272) at RM 2.9
Hurd Creek Hatchery:	Hurd Creek (18.0028) RM, trib to Dungeness River (18.0028) at RM 2.8.
SolDuc Hatchery:	SolDuc River (20.0096) at RM 29.

1.6) Type of program.

Integrated Recovery

1.7) Purpose (Goal) of program.

Restoration

The goal of this program is the restoration of the indigenous chinook salmon in the Elwha River.

1.8) Justification for the program.

This program enhances the survival of Elwha Chinook due to the loss of natural spawning and rearing habitat as a result of hydropower development at RM 4.9. Upon dam removal, the program will provide a source of Elwha chinook for reintroduction throughout the Elwha system. This hatchery operation will operate in a manner which is consistent with, and does not hinder the recovery of this listed chinook stock.

1.9) List of program "Performance Standards".

See below.

1.10) List of program "Performance Indicators."

Performance Standards and Indicators for Puget Sound **Integrated Recovery** Chinook programs.

Performance Standard	Performance Indicator	Monitoring and Evaluation Plan
Produce adult fish for spawning escapement	Survival and return rates	Monitor catch and survivals using CWTs (see below*), escapement data
Meet hatchery production goals	Number of juvenile fish released - **3,850,000 fingerlings or sub-yearlings**	Estimating number of fish planted (weighing / counting fish), monitoring proximity to hatchery production goals, number released recorded on Hatchery Division's "plants reports", data available on WDFW database.

Manage for maximum escapement	Hatchery and wild return rates	Monitoring hatchery / wild return rates through trapping (at the hatchery or at weir) and redd and snorkel surveys on the spawning grounds, catch records
Minimize interactions with listed fish through proper broodstock management	Total number of broodstock collected - **2,400 adults**	Measure number of fish actually spawned to meet eggtake goal Hatchery records Trap fish throughout run, dates and times recorded on Hatchery Division's "adult reports, date available on WDFW database. Spawner survey data, CWT data (see below*)
	Sex ratios	
	Timing of adult collection / spawning - **August to early/mid October**	
	Number of listed fish passed upstream - **no rack in river (see section 1.11.1)**	
	Hatchery stray rate- **wire-tag to allow evaluation**	
	Number wild fish used in broodstock - **wire-tag to allow evaluation.** **Mass mark 100% of releases**	
	Return timing of hatchery / wild adults - **see section 2.2.1**	
	Adherence to spawning guidelines - **see section 8**	
Minimize interactions with listed fish through proper rearing and release strategies	Juveniles released as smolts	Future Brood Document (FBD) Hatchery records CWT data (*no present tagging at Elwha. Use Hoko fall chinook as indicator stock)
	Outmigration timing of listed fish / hatchery fish - **prior to July 1 (after natural fish)**	
	Size and time of release **60-80 fpp/ prior to July 1 release**	

Maintain stock integrity and genetic diversity	Effective population size	Spawning guidelines Spawner surveys
	Monitor divergence of hatchery fish morphology and behavior characteristics	
	Hatchery-Origin Recruit spawners	
Maximize in-hatchery survival of broodstock and their progeny; and Limit the impact of pathogens associated with hatchery stocks, on listed fish	Fish pathologists will monitor the health of hatchery stocks on a monthly basis and recommend preventative actions / strategies to maintain fish health	Co-Managers Disease Policy Fish Health database
	Fish pathologists will diagnose fish health problems and minimize their impact	
	Vaccines will be administered when appropriate to protect fish health	
	A fish health database will be maintained to identify trends in fish health and disease and implement fish health management plans based on findings	
	Fish health staff will present workshops on fish health issues to provide continuing education to hatchery staff.	
Ensure hatchery operations comply with state and federal water quality standards through proper environmental monitoring	NPDES compliance	Monthly NPDES reports

1.10.1) "Performance Indicators" addressing benefits.

1) Evaluate post-release smolt-to-adult survival rate for hatchery-reared juvenile fall chinook salmon through fishery contribution (Hoko fall chinook indicator stock for the Straits) and escapement estimates.

2) Collection of sufficient broodstock from Elwha River returns to meet programmed release numbers.

3) Use of broodstock collection, mating and fish cultural methods which maintain the genetic integrity of the stock.

4) Use of fish cultural methods which lead to the release of high quality smolts.

5) Collection of broodstock helps assure continuation of the run in the event that the natural-spawning fish encounter catastrophic conditions.

1.10.2) "Performance Indicators" addressing risks.

1) Stress-related mortality of returning adults collected as broodstock (including hatchery and natural-origin fish), and increased mortality of eggs from spawned adults, resulting from high water temperatures in the reservoirs during the late summer, early fall adult migration period.

2) Potential adverse genetic and ecological effects of the existing mainstem fall chinook salmon release program on natural salmonid populations.

3) Risk of additional collections of natural adults for broodstock to the natural donor populations.

4) Potential for long-term genetic deterioration is accentuated by the significant number of hatchery fish released through the program and the indefinite nature of the program

5) Continued infusion and presence of hatchery-origin fall chinook on the spawning grounds makes it difficult to accurately assess the health of the natural population.

1.11) Expected size of program.

The present size of the release program is 3.85 million zero-age smolts at 80 fish per pound (fpp). This number is based on early mitigation agreements with the original dam owners/operators, Crown Zellerbach Paper Company. Achieving this release goal is dependent on acquiring the appropriate number of adults and minimizing pre-spawning mortality due to *Dermocystidium* outbreaks, which are exacerbated by high water temperatures.

The ongoing "Elwha Basin Recovery Plan" discussions may result in changes to the program. The Elwha River Ecosystem Recovery Team is working with the NMFS

Science Center staff and the Hatchery Scientific Review Group, HSRG, to discuss appropriate production goals and protocols. This is in reponse to the future removal of the Elwha River dams which is tentatively scheduled for 2005 - 2007.

1.11.1) Proposed annual broodstock collection level (maximum number of adult fish).

The total escapement goal to the Elwha river is 2900 adults, which has not been achieved since 1992. Of these, 2,400 are required for the hatchery program and 500 for wild spawning in the river. A portion of the adult spawners volunteer into the off-river adult trap but this number is normally less than 50% of the needed adults. In addition, broodstock is seined from several holding pools, or gaffed off the spawning grounds in the river.

If funding is made available, WDFW proposes to collect all chinook broodstock beginning in 2003, prior to (2 years) and during dam removal, by installing a weir in the lower river at approximately RM 1.7. The adult chinook will be transported to the WDFW rearing channel in a 400 gallon tank for holding and spawning.

1.11.2) Proposed annual fish release levels (maximum number) by life stage and location.

Life Stage	Release Location	Annual Release Level
Eyed Eggs		
Unfed Fry		
Fry		
Fingerling	Elwha River (18.0272)	3,850,000
Yearling		

1.12) Current program performance, including estimated smolt-to-adult survival rates, adult production levels, and escapement levels. Indicate the source of these data.

Green egg to fry survival: Range = 82.7 to 97.9% Average = 92% (HOPPS)
Fry to smolt survival: Range = 98.2% to 99.3% Average = 98.7% (HOPPS)

There have been limited CWT groups released in the past. 1992 brood yearlings survived at 0.24% and 1994 brood subyearlings survived at a rate of 0.09%. 1994 brood yearlings have survived at 0.06%.

1.13) Date program started (years in operation), or is expected to start.

Chinook releases into the Elwha River started in 1914, but consistent annual releases did not occur until 1953. The Elwha Hatchery facility, built in 1974, was originally designed

to be a spawning channel, but because of difficulties in attracting adults onto the site, it was modified for use as rearing ponds.

1.14) Expected duration of program.

Ongoing. This program will continue indefinitely with the objective of mitigating for the loss of upriver access. The potential removal of the two dams may alter the current program via the "Elwha Basin Recovery Plan" discussions.

1.15) Watersheds targeted by program.

Elwha River (18.0272)

1.16) Indicate alternative actions considered for attaining program goals, and reasons why those actions are not being proposed.

As per 1.13, the Elwha Hatchery was originally designed to operate as a spawning channel to compensate for the loss of suitable spawning gravel in the Elwha River. It failed to draw sufficient adults from the river so it has been since operated as a rearing pond.

SECTION 2. PROGRAM EFFECTS ON ESA-LISTED SALMONID POPULATIONS.

2.1) List all ESA permits or authorizations in hand for the hatchery program.

No ESA Permits.

This hatchery, as well as other WDFW hatcheries within the Puget Sound Chinook ESU, operates under U.S. v Washington and the Puget Sound Salmon Management Plan. This co-management process requires that both the State of Washington and the relevant Puget Sound Tribe(s) develop *Equilibrium Broodstock Programs* and enter into agreement the function, purpose and release strategies of all hatchery programs.

The WDFW Elwha Rearing Channel has operated under an agreement between WDFW and Crown Zellerbach Corporation, dated April 25, 1975. It identifies the level of production to be met and Crown's responsibility for operating costs at the facility. The dams have been purchased by the federal government and are operated by the Bureau of Reclamation. Negotiations are in progress to determine how operating costs at the WDFW facility will be paid in the future.

Two brood documents are reviewed and agreed to annually. The Future Brood Document is a detailed listing of annual production goals. This is reviewed and updated each spring and finalized in July. The Current Brood Document reflects actual production relative to the annual production goals. It is developed in the spring after eggs are collected.

Only WDFW agency staff or volunteers under the supervision of staff are involved in the collection/sorting of brood stock.

Two additional processes that involve co-managers include the Annual Management Framework Plans and Salmon Runs' Status reports for the Strait of Juan de Fuca, and the Annual Winter and Summer Steelhead Forecasts and Management Recommendations, both authored by the PNPTC, WDFW and Makah Tribe.

Although not directly related to hatchery programs, the North of Falcon Process should be mentioned as an avenue for developing harvest regulations. This is an annual process that involves co-managers and stakeholders, and a process that is conducted in concert with the Pacific Fisheries Management Council. The primary focus is to develop salmon fishing regulations for commercial and recreational fisheries in marine and freshwater areas.

In addition, WDFW hatchery programs in Puget Sound must adhere to a number of guidelines, policies and permit requirements in order to operate. These constraints are designed to limit adverse effects on cultured fish, wild fish and the environment that might result from hatchery practices. Following is a list of guidelines, policies and permit requirements that govern WDFW hatchery operations:

Genetic Manual and Guidelines for Pacific Salmon Hatcheries in Washington. These guidelines define practices that promote maintenance of genetic variability in propagrated salmon (Hershberger and Iwamoto 1981).

Spawning Guidelines for Washington Department of Fisheries Hatcheries. Assembled to complement the above genetics manual, these guidelines define spawning criteria to be used to maintain genetic variability within the hatchery populations (Seidel,1983).

Stock Transfer Guidelines. This document provides guidance in determining allowable stocks for release for each hatchery. It is designed to foster development of locally-adapted broodstock and to minimize changes in stock characteristics brought on by transfer of non-local salmonids (WDF 1991).

Fish Health Policy of the Co-managers of Washington State. This policy designates zones limiting the spread of fish pathogens between watersheds, thereby further limiting the transfer of eggs and fish in Puget Sound that are not indigenous to the regions (WDFW, NWIFC, WSFWS 1998).

National Pollutant Discharge Elimination System Permit Requirements This permit sets forth allowable discharge criteria for hatchery effluent and defines acceptable practices for hatchery operations to ensure that the quality of receiving waters and ecosystems associated with those waters are not impaired.

2.2) Provide descriptions, status, and projected take actions and levels for ESA-listed natural populations in the target area.

2.2.1) Description of ESA-listed salmonid population(s) affected by the program.

Elwha River Chinook

Adult Age Class Structure - Ages range from 2 to 6 year olds, predominately 4 and 5 year olds.

Sex Ratio - Unknown. Assumed to be 1.5 males to females when estimating the number of wild spawners from redd counts.

Size Range - From gaffed adults, fish volunteering to the hatchery and spawning ground surveys (WDFW database, 1987-98). Samples ranged from 45cm to126cm in length.

Migrational Timing - River entry begins in early June through early October (SASSI, 1992).

Spawn Timing and Range - Spawning begins in late August and peaks in late September to early October (SASSI, 1992).

Juvenile Life History - It is believed that the predominate juvenile life history pattern is to emigrate as subyearling with freshwater rearing time after emergence of around 5 to 8 months. However, prior to the two dams which block the majority of anadromous habitat, multiple juvenile rearing and emigration strategies probably existed for this stock.

- Identify the ESA-listed population(s) that will be directly affected by the program.

Elwha River Chinook.

- Identify the ESA-listed population(s) that may be incidentally affected by the program.

Bull trout are listed as threatened in the Elwha. There may be some competition between juvenile bull trout and planted chinook, however, this has not been documented. Bull trout may actually benefit from large plants of chinook fry by preying upon some of them.

2.2.2) Status of ESA-listed salmonid population(s) affected by the program.

- Describe the status of the listed natural population(s) relative to "critical" and "viable" population thresholds

"Critical" and "viable" population thresholds under ESA have not yet been developed. Under SASSI (December 1992), the Elwha Chinook population is listed as "healthy". However, the state and tribe testified to the Biological Review Team (BRT) that because the hatchery is not making escapement goals in 3 out of 5 years, it should be listed as "critical".

- Provide the most recent 12 year (e.g. 1988-present) progeny-to-parent ratios, survival data by life-stage, or other measures of productivity for the listed population. Indicate the source of these data.

Progeny to parent ratios - There is no progeny to parent ratios or survival by life-stage

data for Elwha wild chinook. It is assumed that a majority of the Elwha River adult returns are of hatchery origin (Bill Freymond, WDFW pers. comm.). These data do exist for the hatchery adults and their progeny but the data may not be complete due to the nature of adult returns and adult recovery on the river. Less than 50% of adults recovered for broodstock volunteer into the hatchery trap. The remainder are netted or gaffed from the spawning grounds.

Survival data from release to return is limited due to the number of brood years identified with CWTs. The 1992 brood survived at a rate of .24% with returns being of 3 to 6 years of age. Three tag groups were released from the 1994 brood. Two 0+ groups averaged .09% survival through 1999. A third l+ group survived at a rate of .06% through 1999. Additional recoveries from the 1994 brood are expected in 2000 if recovery patterns are consistent with the 1992 brood year recoveries.

- Provide the most recent 12 year (e.g. 1988-1999) annual spawning abundance estimates, or any other abundance information. Indicate the source of these data.

Most recent 12 year estimates of annual spawning abundance estimates - The following table provides spawning escapement estimates for Elwha River chinook for 1988-1999 (includes hatchery & in-river spawners). The escapement goal is 2,900 annually (2,400 for the hatchery and 500 wild spawners).

Elwha River Chinook Total Escapements, 1988-99. (* see note below)

Year	Total Escapement
1988	7,873
1989	5,487
1990	3,180
1991	3,469
1992	3,859
1993	1,569
1994	1,546
1995	1,812
1996	1,875
1997	2,527
1998	2,409
1999	1,606
2000	2,074
2001	2,303

NOTE * : It is assumed that a majority of the natural spawners are hatchery-origin fish.

- Provide the most recent 12 year (e.g. 1988-1999) estimates of annual proportions of direct hatchery-origin and listed natural-origin fish on natural spawning grounds, if known.

It is assumed that the majority of the chinook on the spawning grounds are of hatchery origin.

2.2.3) Describe hatchery activities, including associated monitoring and evaluation and research programs, that may lead to the take of listed fish in the target area, and provide estimated annual levels of take

- Describe hatchery activities that may lead to the take of listed salmonid populations in the target area, including how, where, and when the takes may occur, the risk potential for their occurrence, and the likely effects of the take.

Broodstock collection includes adults volunteering to the hatchery plus river beach seining and gaffing activities to assure egg take goals are met. This activity has the potential to take listed chinook through capture/handling mortalities. At this time, < 50% of the egg take needs are met by adult chinook volunteering into the adult trap. The remainder must be netted or gaffed from the river to fulfill the program needs.

The intentional and lethal take of 2,400 broodstock is necessary to perpetuate the listed stock in the hatchery. The unintentional take of up between 5% and 30% of the captured broodstock may be incurred due to holding losses normally associated with the parasite Dermocystidium sp. ("Dermo"). The losses in the holding pond mirror the losses in the river of Chinook in the river. Normal losses of incubating eggs and reared fish are expected as a part of the routine rearing process. See Take Table for further detail.

Due to uncertainties about water quality during dam removal, and how it might affect the ability to secure returning broodstock, a plan has been proposed to collect all chinook broodstock, prior to (2 years) and during dam removal, by installing a weir in the lower river at approximately RM 1.7. The adult chinook will be transported to the WDFW rearing channel in a 400 gallon tank for holding and spawning. Proper notification shall be rendered to all appropriate parties when a final decision is made by the Elwha River Ecosystem Restoration Team. The milestones which would lead to construction of an in-stream weir are not yet clearly defined or finalized because plans for the removal of the Elwha Dams are not complete at this writing.

- Provide information regarding past takes associated with the hatchery program, (if known) including numbers taken, and observed injury or mortality levels for listed fish.

See below.

- Provide projected annual take levels for listed fish by life stage (juvenile and adult) quantified (to the extent feasible) by the type of take resulting from the hatchery program (e.g. capture, handling, tagging, injury, or lethal take).

See "take" table at end of HGMP.

-Indicate contigency plans for addressing situations where take levels within a given year have exceeded, or are projected to exceed, take levels described in this plan for the program.

None.

SECTION 3. RELATIONSHIP OF PROGRAM TO OTHER MANAGEMENT OBJECTIVES

3.1) Describe alignment of the hatchery program with any ESU-wide hatchery plan (e.g. *Hood Canal Summer Chum Conservation Initiative*) or other regionally accepted policies (e.g. the NPPC *Annual Production Review* Report and Recommendations - NPPC document 99-15). Explain any proposed deviations from the plan or policies.

There is currently no ESU-wide hatchery plan in place.

Hatchery program operation is consistent with the "Agreement Covering Contribution Toward Cost of Construction and Operation of Salmon Rearing Pond and Appurtenant Facilities on Elwha River"(Agreement, April 25, 1975). Fish production is in accordance with the current Future Brood Document. Since the purchase and operation of the dams by the federal government in late February, 2000, negotiations have been ongoing to determine how operation costs are paid. The fish restoration plan presented in the 1995 EIS for dam removal in the Elwha River is currently being reviewed by the WDFW, Elwha Tribe, and USFWS to determine future needs by species with special emphasis on the listed chinook stock. Production goals, planting levels, and planting strategies for chinook and other species will be identified.

Cooperative agreement with tribes concerning time and size at release (60-80 fpp and prior to July 1).

Elwha River Ecosystems Restoration Act.

3.2) List all existing cooperative agreements, memoranda of understanding, memoranda of agreement, or other management plans or court orders under which program operates.

The HGMP is a direct reflection of current plans and agreements identified in 2.1 and 3.1 above.

3.3) Relationship to harvest objectives.

Presently, no harvest is directed on this stock. Terminal chinook fisheries, and terminal fisheries for other species as well, have been curtailed in the Elwha River and marine areas in the proximity of the Elwha River to minimize impacts to listed chinook. Adult fish are harvested in mixed stock marine waters, particularly the ocean and the Strait of Juan de Fuca as well as Canadian waters. Specific exploitation rates are unknown.

Harvest of the Elwha chinook, both directly and indirectly, is an objective when recovery at MSH levels are attained. The future operation of and goals for the hatchery, as well as the long term potential for harvest of Elwha River Chinook, will depend in part upon the natural productivity of the Elwha River, post dam removal.

3.3.1) Describe fisheries benefitting from the program, and indicate harvest levels and rates for program-origin fish for the last twelve years (1988-99), if available.

There is currently no targeted harvest on this stock. WDFW run reconstruction data shows harvest (all indirect) for the past 12 years as follows:

Year	Total Catch
1988	1,210
1989	329
1990	464
1991	355
1992	197
1993	126
1994	76
1995	40
1996	9
1997	44
1998	60
1999	NA

* from 1995-98 catches represent primarily pre-terminal interceptions.
In-river mortalities are as follows: 1995 = 2; 1996 = 2; 1997 = 1; 1998 = 2.

3.4) Relationship to habitat protection and recovery strategies.

The major factor impacting natural production in the Elwha are the two dams on the river. The lower dam is located at RM 4.9. The hatchery production in the Elwha is helping maintain this stock until adequate habitat is available. The long term plan (within four years) is to remove both dams, thus creating access to over 40 miles of anadromous habitat for chinook and other species. The current hatchery program will be critical to providing chinook for this part of the recovery program. The long term future of the hatchery program will depend, at least in part, upon how successfully Chinook re-colonize the Elwha River, post-dam removal.

Additionally, the Elwha Tribe recently completed a log jam installation to protect very important side channel spawning and rearing habitat.

3.5) Ecological interactions.

Predation of hatchery-origin Elwha chinook juveniles on naturally produce juveniles is assumed to be low since 1) the hatchery fish, while larger at release, are not large enough to utilize the natural fish as a food source and 2) the hatchery fish are released prior to July 1, after the natural fish outmigration.

Competition of hatchery-origin Elwha juveniles chinook with their naturally produced counterparts in the freshwater and marine areas is considered unknown. However, the fact that the hatchery chinook are released after the outmigration time of the naturally produced chinook may reduce or eliminate this interaction.

Coho (650,000) and steelhead (120,000) raised at the Elwha Tribal facility are released as smolts in May. Elwha Hatchery chinook releases are made prior to July 1 after the coho and steelhead have cleared the system. No direct interactions have been documented. Bull trout may actually benefit by preying on chinook.

SECTION 4. WATER SOURCE

4.1) Provide a quantitative and narrative description of the water source (spring, well, surface), water quality profile, and natural limitations to production attributable to the water source.

Surface and well water are both used in the production of Elwha chinook. Up to 1200 gallons per minute (gpm) of well water is available and used for adult holding, incubation and initial rearing. Surface water, taken directly from the Elwha, is used in later rearing (up to 16,000 gpm) and for adult attraction. Monitoring and reporting of effluent discharge results have always been in compliance with NPDES guidelines under permit WAG-13-1043.

Future discussions for Elwha will include improved incubation water sources and quantity and an improved adult attraction water supply.

Well water is used at Hurd Creek for eyeing Elwha chinook eggs.

Spring water is used at Sol Duc for both incubation and initial rearing of Elwha chinook. Monitoring and reporting of effluent discharge results have always been in compliance with NPDES guidelines under permit number WAG-13-1405.

4.2) Indicate risk aversion measures that will be applied to minimize the likelihood for the take of listed natural fish as a result of hatchery water withdrawal, screening, or effluent discharge.

The four revolving screens on the hatchery water intake meet state and federal intake screen standards and pose no risk to listed chinook. Wild migrants which enter the intake pipe are diverted back to the fiver at a bypass structure adjacent to the screens. Hatchery discharge results are monitored and reported per NPDES guidelines and are in compliance with NPDES guidelines under permit WAG-13-1043.

SECTION 5. FACILITIES

5.1) Broodstock collection facilities (or methods).

Three methods of broodstock collection are used at Elwha:

1. Beach seining at two specific adult holding areas on the Elwha.
2. Volunteers to the adult trap at the hatchery facility.
3. Gaffing of spawning adults on the river..

* Gill nets have been used in the past for adult collection.

Due to poor attraction and trapping capabilities, less than 50% of the broodstock needs are met with volunteers into the hatchery trap.

If funding is made available, WDFW proposes to collect all chinook broodstock beginning in 2003, prior to (2 years) and during dam removal, by installing a weir in the lower river at approximately RM 1.7. The adult chinook will be transported to the WDFW rearing channel in a 400 gallon tank mounted on a flatbed truck.

5.2) Fish transportation equipment (description of pen, tank truck, or container used).

Green adults (those not ready to spawn) are transported to the hatchery in a 400 gallon tank mounted on a flatbed truck.

5.3) Broodstock holding and spawning facilities.

Located at the lower end the rearing channel, the adult holding area measures 125 ' X 50' X 2.5'. There is also a 15' X 20' covered spawning shed. The adult holding pond is supplied with well water.

5.4) Incubation facilities.

A small incubation system consisting of 16 half stack vertical incubators is set up each year at the head of the rearing channel at Elwha Hatchery. It is covered by a 21' X 28' canvas Quonset hut.

At Sol Duc, eggs are raised from the eyed stage (via Hurd Creek) to ponding in Heath vertical incubators. These eggs are isolated from others at Sol Duc and are checked daily. There are 35 full vertical incubator stacks that can be used to isolate individual egg takes.

At Hurd Creek, eggs are incubated to the eyed stage in both vertical incubators and isolation incubation buckets.

5.5) Rearing facilities.

Fish that are incubated at Elwha are started in a 20' X 20' X 2' section of the rearing channel. As the fish begin to outgrow this section of the channel, the screens are pulled and the fish are allowed to enter the upper half of the main channel, an area measuring 700' X 50' X 3'.

Elwha chinook initially reared at Sol Duc Hatchery are started in two Burroughs ponds that are 20' X 120' and hold 45,000 gallons of water each. These ponds are supplied with spring water as needed (up to 900 gallons per minute each). This component of the hatchery population is held at Sol Duc until the fish reach a size of about 500 fish per pound (fpp); then they are shipped to Elwha for the final rearing.

5.6) Acclimation/release facilities.

The chinook are acclimated to Elwha River water almost the entire time they are in the channel. Although, when fish are started at the head end of this channel, they may be supplied exclusively with well water. The juvenile chinook are released directly from the channel through the adult holding area and into the Elwha River.

5.7) Describe operational difficulties or disasters that led to significant fish mortality.

No operational difficulties have led to significant fish loss.

5.8) Indicate available back-up systems, and risk aversion measures that will be applied, that minimize the likelihood for the take of listed natural fish that may result from equipment failure, water loss, flooding, disease transmission, or other events that could lead to injury or mortality.

At Elwha, gravity feed river water can be used as a backup in the event of loss of power to the well pumps.

At Sol Duc, all rearing water is gravity fed to the ponds.

At Hurd Creek, a generator supplies back-up power in the event of power loss.

SECTION 6. BROODSTOCK ORIGIN AND IDENTITY

Describe the origin and identity of broodstock used in the program, its ESA-listing status, annual collection goals, and relationship to wild fish of the same species/population.

6.1) Source.

Naturally spawning chinook from the Elwha River were the original source of broodstock. Now the source is chinook volunteering into the trap at the Elwha Hatchery or adults collected from the river.

6.2) Supporting information.

6.2.1) History.

In 1975, a plant of Sol Duc spring chinook occurred in the Elwha. All subsequent broodstock has come from fish of Elwha origin. The genetic effect of the 1975 plant is unknown.

6.2.2) Annual size.

Recovery of marked fish through the gaffing program has proven that a large portion of returning hatchery-origin fish do not volunteer back to the trapping facility. Because hatchery fish return so poorly to the trap, and because the ratios of marked / unmarked fish in both the trap and fish collected from the river are very similar, it is difficult to estimate the proportions of the natural fish used as broodstock or the status of natural populations. The total adult collection goal is 2,400 adults.

6.2.3) Past and proposed level of natural fish in broodstock.

See above. It will not be possible to determine the exact number of wild origin adults being incorporated into the broodstock as the Elwha chinook are not scheduled for mass-marking. Until the trapping facility can be made more effective in trapping the required number of adults, it is highly probable that wild origin adults will be collected and incorporated into the broodstock due to the seining, netting and gaffing operations utilized to collect broodstock.

6.2.4) Genetic or ecological differences.

No known differences have been observed.

6.2.5) Reasons for choosing.

Local, indigenous stock. This program was developed to recover the Elwha chinook which is known to attain a large size at maturity.

6.3) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic or ecological effects to listed natural fish that may occur as a result of broodstock selection practices.

Broodstock selection is totally random from returns to the trap and from fish collected in the river. The hatchery program is totally integrated with the population spawning in the

wild. Marked strays from other systems are not knowingly incorporated into the broodstock. See 7.3

SECTION 7. BROODSTOCK COLLECTION

7.1) Life-history stage to be collected (adults, eggs, or juveniles).

Adults

7.2) Collection or sampling design.

Only 4.9 miles of river are available to anadromous fish, and the Elwha Hatchery is located approximately half way from the mouth to the lower dam; consequently, all adult capture takes place within 2.5 miles of this facility. Seining operations begin in August and may run into early September and take place just below the hatchery in two main adult holding areas. Adult chinook begin volunteering into the hatchery trap in August and continue into early or mid-October. Gaffing starts in early to mid-September and continues to mid or late-October and is conducted one to two miles above and below the hatchery facility. Gaffed fish are normally fully mature and are spawned as they are collected. 75%-80% of targeted fish are extracted in the gaffing operation. All netted, volunteer, and gaffed fish are used in the spawning operation, thereby reducing sources of bias that could lead to a non-representative sample of the broodstock. See Table below for examples of ratios of fish collected by varying methods.

ELWHA TRAP / SPAWN RECORDS

Year	Netted	Gaffed	Volunteers	Total	Loss	Percent
1996	721	457	205	1383	147	10.60%
1997	222	402	318	942	3	0.32%
1998	836	722	138	1696	51	3.00%
1999	92	517	117	726	14	1.90%
2000	289	732	223	1244	21	1.70%
2001	438	958	276	1672	38	2.30%
					Average Loss =	3.30%

Note: 1996 losses were due to dermocystidium(~100 fish) and gill net wounds from fish collected by the Elwha Tribe (~47 fish). Natural in-river loss in 1996, from Dermocystidium equaled ~30%.
For all years, most loss is associated with holding adults and dermocystidium. Only 2 to 3 fish per year are lost per year in the process of collecting adults on the river

If funding is made available, WDFW proposes to collect all chinook broodstock beginning in 2003, prior to (2 years) and during dam removal, by installing a weir in the lower river at approximately RM 1.7. The adult chinook will be transported to the WDFW rearing channel in a 400 gallon tank mounted on a flatbed truck.

7.3) Identity.

There is currently no method for identifying hatchery-origin fish from naturally spawned fish. The hatchery fish have not been coded-wire tagged since 1994 and are not mass marked. Examination of the broodstock for coded-wire tags (1996-98) shows no strays from other systems.

7.4) Proposed number to be collected:

7.4.1) Program goal (assuming 1:1 sex ratio for adults):

Program goal is 2,400 fish annually.

7.4.2) Broodstock collection levels for the last twelve years (e.g. 1988-99), or for most recent years available:

Year	Adults			Eggs	Juveniles
	Females	Males	Jacks		
1988					
1989					
1990					
1991					
1992					
1993					
1994					
1995	385	229	0	1,608,000	
1996	546	597	3	2,060,000	
1997	468	467	4	2,102,000	
1998	932	577	0	4,499,000	
1999	406	293	0	1,789,350	
2000	627	509	0	3,156,500	
2001	824	729	0	4,444,200	

Note: The above adults are collected by three methods: volunteers to the trap, netting, and gaffing. The ratios each year vary widely, but, fish volunteering into the trap normally amount to less than 20% of the total broodstock. See table above in 7.2

7.5) Disposition of hatchery-origin fish collected in surplus of broodstock needs.

Fish have not been collected in excess of broodstock needs; however, in years when large

numbers of volunteers have entered the trap on their own, gaffing has been reduced accordingly to prevent an excess from occurring.

7.6) Fish transportation and holding methods.

Adults netted from the river are placed in 5' diameter ring nets and gently maneuvered to a location where they can be transferred to a 400 gallon tank truck. From the ring nets, the fish are placed head first in a half inner tube (tube is sealed at the bottom end and contains a small amount of water), carried via the tube, and placed in a tank, containing a salt solution, on the truck. Transportation to the hatchery takes 5-15 minutes. The fish are removed from the tank, injected with Liquamycin and placed in the holding pond. Pond covers and sprinklers within the holding area keep the fish relatively calm until they ripen.

If funding is made available, WDFW proposes to collect all chinook broodstock beginning in 2003, prior to (2 years) and during dam removal, by installing a weir in the lower river at approximately RM 1.7. The adult chinook will be transported to the WDFW rearing channel in a 400 gallon tank mounted on a flatbed truck.

7.7) Describe fish health maintenance and sanitation procedures applied.

Adult fish are held on well water, which is considerably cooler than the river, and assumed relatively pathogen free. At one time, volunteering adults were held on ambient river water. Losses of adults in the trap and the river were occasionally excessive, approaching 30%, due to the parasite Dermosystidium (sp.). The loss of trapped adults mirrored the loss of adults in the wild. Trapping does not appear to exacerbate the loss. The use of well water has significantly reduced mortality from "Dermo" to a level of about 5% + or - .

Adults are treated daily with formalin, at a rate not exceeding 25 parts per million (ppm) at the pond outfall, as a precaution against fungus infection.

Eggs at Sol Duc are incubated on spring water and are received close to hatching that formalin treatments are not administered.

7.8) Disposition of carcasses.

In recent years all carcasses have been returned to the river as part of a nutrient enhancement program.

7.9) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic or ecological effects to listed natural fish resulting from the broodstock collection program.

Broodstock selection from the river is totally random. In-river activity is minimized to reduce negative impacts on actively spawning fish and redds. Netted or gaffed adults are

held in well water if they are not ready to spawn, which enhances their survival to spawning. Water from the Elwha River is mostly not used to hold adults due to the high water temperatures and the presence of the parasite Dermosystidium (sometimes surface water is used when water temperatures are low and extra flow may attract more volunteers).

SECTION 8. MATING

Describe fish mating procedures that will be used, including those applied to meet performance indicators identified previously.

8.1) Selection method.

Spawners are taken as they ripen during the entire run. Gaffed fish are normally mated with gaffed fish; netted and volunteer fish are normally mated together, randomly, and without regard to source.

8.2) Males.

Generally, all males collected, including jacks, are used in the spawning operation. Selection is random.

8.3) Fertilization.

Eggs are not fertilized at the Elwha egg-take sites. Sperm is collected in 1 fish units, in plastic bags with oxygen (sperm was pooled in the past). Eggs are collected in 3 or 4 fish pools, depending upon the volume of the eggs. Eggs and sperm are then iced and transported to Hurd Creek for fertilization (although some fertilization takes place at Elwha). Eggs are fertilized in a "factorial" regimen. Prior to fertilization at Hurd Creek, each unit of pooled eggs is broken down into 3 or 4 buckets, depending upon the number of females, and each aliquot is fertilized with sperm from 1 male. After a few moments, the eggs are recombined and placed into isolation incubation units for water hardening in iodophor and incubated until virus-free certification is completed.

8.4) Cryopreserved gametes.

NA

8.5) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic or ecological effects to listed natural fish resulting from the mating scheme.

Adults to be spawned will be chosen at random from the available gene pool. Out of basin strays will not be knowingly spawned or incorporated into the gene pool. Every attempt will be made to ensure that the egg-take is representative of the entire chinook run in the Elwha River.

SECTION 9. INCUBATION AND REARING -

Specify any management *goals* (e.g. "egg to smolt survival") that the hatchery is currently operating under for the hatchery stock in the appropriate sections below. Provide data on the success of meeting the desired hatchery goals.

9.1) Incubation:

Elwha chinook egg (approximately 4+ million) are shipped, unfertilized, to Hurd Creek for eyeing and virus certification. Upon certification, the eyed eggs are shipped to the Solduc Hatchery for incubation and initial rearing. The fry are returned to Elwha at 500 fish per pound (fpp) by April of each year (often as early as late February if the fish are large enough to return to Elwha) for final rearing and imprinting on Elwha river water prior to release.

A portion of the Elwha egg take is also held at Elwha in a small incubation system consisting of 16 half stack vertical incubators is set up each year at the head of the rearing channel at Elwha Hatchery. It is covered by a 21' x 28' canvas Quonset hut. These eggs that stay at Elwha are usually those that cannot be viral certified and must remain in the Elwha watershed.

9.1.1) Number of eggs taken and survival rates to eye-up and/or ponding.

Year	# Eggs Taken
1988	5,907,000
1989	5,193,000
1990	4,395,000
1991	4,861,000
1992	825,000
1993	2,319,000
1994	2,387,800
1995	1,608,000
1996	2,060,000
1997	2,102,000
1998	4,499,000
1999	1,789,000
2000	3,156,500
2001	4,444,200

Survival to the eyed stage of eggs held at Elwha has averaged 88% for the past three years. However, in 1999 a 95% survival to the eyed stage was achieved after modifications to the formalin delivery system.

Survival to the eyed stage for eggs incubated at Hurd Creek has ranged from 90.2% to 95.5% (average 93.1 %) from1995 thru 2000.

Fish hatched and reared at Sol Duc have 95% plus egg to fry survival rates. This includes fry loss after hatching and the losses attributed to transport back to Elwha.

9.1.2) Cause for, and disposition of surplus egg takes.

There are no surplus eggs associated with this recovery program.

9.1.3) Loading densities applied during incubation.

Elwha chinook eggs average 1300 per pound (/lb) with a range of 1200/lb to 1400/lb. At Elwha, they are incubated in vertical style incubators (FAL) at 5 lbs (6000 - 7000 eggs) per tray with a flow of 4 gallons per minute (gpm).

Eyed eggs at Sol Duc are incubated at 8,000 eggs per tray. This is an average of about 6 lbs per tray. Flows are 4 gpm.

Elwha eggs eyed at Hurd Creek are incubated in fifteen liter downwell isolation buckets, in 3-5 fish pools, with a flow of ½ gpm per bucket.

9.1.4) Incubation conditions.

At Elwha, 49°F degree well water is the primary source for the incubation system; river water is the backup. Dissolved oxygen (DO) levels at the intake and outflow of a fully loaded stack have been 8 parts per million (ppm) or greater.

At Hurd Creek, eggs are incubated on pathogen free ground water at constant 47° F. All effluent water is discharged through an ultra-violet treatment unit. No silt removal is required. Dissolved oxygen remains constant at 11.2 mg/l (milligrams/liter), provided by a de-gassing tower on the well water supply.

At Sol Duc, the spring water source provides very clean water at a constant 46° F. DO levels stay well within normal incubation levels.

9.1.5) Ponding.

At Elwha, ponding occurs when the fish are 95 to 100% "buttoned up", i. e., with a yolk slit 2 millimeters (mm) or less, and 1650-1700 accumulated Temperature Units (TU's). Ponding usually takes place from December to early January. Fish are taken directly from incubators to the starter pond.

At Sol Duc, ponding of Elwha chinook occurs in December and January when the fish are 95%+ buttoned up. The fry are placed directly into the Burroughs pond for rearing.

9.1.6) Fish health maintenance and monitoring.

At Elwha fungus is controlled with a daily formalin drip treatment. Dead eggs are either

removed by hand picking or by salt dipping.

At Hurd Creek, fungus control is by formalin injection directly into the water supply header for each row of isolation buckets. Application rate is one 15 minute injection per day at a target dose of 1667 ppm formalin. At approximately 500 TU's the eggs are shocked and dead eggs removed by hand picking. After mortality removal, all eyed eggs are inventoried and are transferred to the Sol Duc Hatchery for hatching and initial rearing.

At Sol Duc eggs are incubated on spring water to minimize fungus growth.

9.1.7) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish during incubation.

All Elwha chinook eggs are incubated on well water or spring water to minimize loss due to siltation and pathogens.

At Hurd Creek eggs are incubated on well water to avoid loss due to silt and pathogens. All systems are alarmed with 24 hr/day monitoring and an emergency backup generator.

Sol Duc is able to incubate using very clean spring water. Siltation is never a problem during incubation.

9.2) Rearing:

9.2.1) Provide survival rate data (*average program performance*) by hatchery life stage (fry to fingerling; fingerling to smolt) for the most recent twelve years (1988-99), or for years dependable data are available..

For Elwha, the average survival from ponding to release (1995 - 1999) was 98.1%

9.2.2) Density and loading criteria (goals and actual levels).

Fish are reared with at loadings under 3 lbs of fish /gpm at release and under .35 lbs /cubic foot (cu.ft).

9.2.3) Fish rearing conditions

At Elwha, fish are started on 49° F. well water but are soon shifted to surface water from the Elwha River. Average river water temperatures over a four year period of juvenile rearing are: January 37-41°F, February 38-42°, March 40-45°F, April 42-47°F, May 45-50°F, June 49-54°F. Dissolved oxygen has always been at least 10 ppm at the outflow.

Early rearing at Solduc utilizes spring water at a constant 46°F.

9.2.4) Indicate biweekly or monthly fish growth information (*average program performance*), including length, weight, and condition factor data collected during rearing, if available.

At Elwha, average monthly size over the last three years is as follows: from ponding to end of January 625 fish per pound (fpp), February 485 fpp, March 310 fpp, April 175 fpp, May 105 fpp, June 80 fpp or slightly larger.

At Sol Duc, the fish average 900 fpp at the end of January and average 500 fpp by the end of February. Fish are then shipped back to Elwha for rearing.

9.2.5) Indicate monthly fish growth rate and energy reserve data (*average program performance*), if available.

Not available.

9.2.6) Indicate food type used, daily application schedule, feeding rate range (e.g. % B.W./day and lbs/gpm inflow), and estimates of total food conversion efficiency during rearing (*average program performance*).

Fish feeding frequencies begin at 8 feedings/day and end at 2 feedings/day. Depending on fish size and water temperature, feed rates vary from 1.75% to 2.25% B.W./day. An overall season food conversion rate of approximately 1.2:1 is considered normal.

Bio Diet Starter #3 is fed to the Elwha chinook while at Sol Duc. Pelleted Bio-Diet feeds are fed as a daily grower diet.

9.2.7) Fish health monitoring, disease treatment, and sanitation procedures.

Fish health is monitored on a daily basis by hatchery staff and at least monthly by a state Fish Health Specialist. Treatments prescribed by the FHS are carried out by hatchery personnel. Procedures are consistent with the Co-Manager's Salmonid Disease Policy.

9.2.8) Smolt development indices (e.g. gill ATPase activity), if applicable.

NA

9.2.9) Indicate the use of "natural" rearing methods as applied in the program.

NA

9.2.10)Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish under propagation.

Fish will be planted as fingerling smolts to minimize the risk if domestication which may arise from rearing to the yearling smolt stage. All reasonable and prudent measures will be employed to minimize rearing and incubation losses. These include the use of high quality spring or well water for incubation, use of high quality feeds for rearing, rearing densities and loadings which conform with best management practices and frequent fish health inspections.

SECTION 10. RELEASE

Describe fish release levels, and release practices applied through the hatchery program.

10.1) Proposed fish release levels.

Age Class	Maximum Number	Size (fpp)	Release Date	Location
Eggs				
Unfed Fry				
Fry				
Fingerling	3,850,000	60-80	prior to July 1	Elwha River
Yearling				

10.2) Specific location(s) of proposed release(s).

Stream, river, or watercourse:
Release point: Elwha River (18.0272) at RM 2.9
Major watershed: Elwha River
Basin or Region: Strait of Juan de Fuca

10.3) Actual numbers and sizes of fish released by age class through the program.

Release year	Eggs/ Unfed Fry	Avg size	Fry	Avg size	Fingerling	Avg size	Yearling	Avg size
1988					3,327,300	45	661,700	8.5
1989					3,010,300	48	712,500	8.8
1990							719,500	9.0
1991					2,031,500	67	160,300	7.0
1992					2,918,000	72	611,400	8.5
1993					212,600	38	419,400	4.8
1994					1,467,000	67	488,000	8.0
1995					1,862,000	62	481,400	7.0
1996					1,552,000	51	513,000	7.5

Release year	Eggs/ Unfed Fry	Avg size	Fry	Avg size	Fingerling	Avg size	Yearling	Avg size
1997					2,375,000	61	0	0
1998					2,176,000	70	0	0
1999					4,025,000	78	0	0
2000					1,803,000	64	0	0
2001					2,583,000	60	0	0
Average					2,366,460	60.2	529,700	7.7

10.4) Actual dates of release and description of release protocols.

1999 released 8-28 June as fingerlings, 1998 released 16-23 June as fingerlings, 1997 released 24-25 June as fingerlings and 22-30 April as yearlings, 1996 released 19-27 June as fingerlings and 1-8 May as yearlings, 1995 released 15 June as fingerlings and 1-3 May as yearlings. Fish release dates are dictated by visible signs that the fish want to migrate, ie. swimming edges, working screens etc. Screen are pulled to start a volitional release and the remainder are forced to leave after feed has run out or very few remain.

10.5) Fish transportation procedures, if applicable.

All fish are released on-station. No transportation of juveniles.

10.6) Acclimation procedures

All Elwha chinook are acclimated on Elwha River water from shortly after hatching until release.

10.7) Marks applied, and proportions of the total hatchery population marked, to identify hatchery adults.

No coded-wire tagging has occurred since the 1994 brood. At that time, 10.65% of the population was identified with an adipose clip and coded-wire tag. These fish are not scheduled to be coded-wire tagged or mass marked (adipose-fin clip only). Hoko River fall chinook are used as the indicator stock for the Straits of Juan de Fuca.

WDFW shall, as a management intent, apply an identifiable mark to 100% of the fall chinook salmon sub-yearlings and yearlings released through the hatchery program each year to allow monitoring and evaluation of the hatchery program fish releases and adult returns.

WDFW shall apply coded-wire tags to a portion of the sub-yearling fall chinook production at Elwha Hatchery to allow for evaluation of fishery contribution and survival rates, and of straying levels to other Puget Sound watersheds.

10.8) Disposition plans for fish identified at the time of release as surplus to programmed or approved levels.

No program surplus exists in this recovery program.

10.9) Fish health certification procedures applied pre-release.

Prior to release, fish health is monitored and checked by a WDFW Fish Health Specialist.

10.10) Emergency release procedures in response to flooding or water system failure

Emergency release procedures in case of water system failure involve removal of screens and stoplogs, switching to a gravity water system, and allowing fish to migrate. If an emergency occurred at the Sol Duc hatchery the fish would be placed on an alternative water source and then transported back to Elwha..

10.11) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish resulting from fish releases.

Hatchery chinook will be liberated as fingerling smolts in June to minimize in-river residence and reduce potential competition and predation on native, wild salmonids.

SECTION 11. MONITORING AND EVALUATION OF PERFORMANCE INDICATORS

11.1) Monitoring and evaluation of "Performance Indicators" presented in Section 1.10.

See section 1.10 for Monitoring and Evaluation.

The purpose of a monitoring program is to identify and evaluate the benefits and risks which may derive from the hatchery program. The monitoring program is designed to answer questions of whether the hatchery is providing the benefits intended, while also minimizing or eliminating the risks inherent in the program. A key tool in any monitoring program is having a mechanism to identify each hatchery production group.

Each production group shall be identified with distinct otolith marks, adipose clips, coded wire tags, blank wire tags or other identification methods as they become available, to allow for evaluation of each particular rearing and/or release strategy. This will allow for selective harvest on hatchery stocks when appropriate, monitoring of interactions of hatchery and wild fish wherever they co-mingle in riverine, estuarine and marine habitats and assessment of the status of the target population. WDFW shall monitor the Chinook salmon escapement into the target and non-target Chinook populations to estimate the number of tagged, un-tagged and marked fish escaping into the river each year and the stray rates of hatchery Chinook into the rivers.

WDF&W shall monitor the chinook salmon escapement to the Elwha River to estimate the number of tagged, untagged, and marked fish escaping to the river each year. This monitoring will allow for assessment of the status of the target population and the success of the program in achieving restoration objectives.

11.1.1) Describe plans and methods proposed to collect data necessary to respond to each "Performance Indicator" identified for the program.

See section 1.10, "Monitoring and Evaluation Plan"

11.1.2) Indicate whether funding, staffing, and other support logistics are available or committed to allow implementation of the monitoring and evaluation program.

Funding and resources are currently committed to monitor and evaluate this program as detailed in the Resource Management Plan for Puget Sound Chinook Salmon Hatcheries (Washington Department of Fish and Wildlife and Puget Sound Treaty Tribes, August 23, 2002) The resources are limited though and funding is not available to expand either monitoring or evaluation of this program.

11.2) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish resulting from monitoring and evaluation activities.

Monitoring and evaluation will be undertaken in a manner which does not result in an unauthorized take of listed chinook.

SECTION 12. RESEARCH

12.1) Objective or purpose.

None.

12.2) Cooperating and funding agencies.

12.3) Principle investigator or project supervisor and staff.

12.4) Status of stock, particularly the group affected by project, if different than the stock(s) described in Section 2.

12.5) Techniques: include capture methods, drugs, samples collected, tags applied.

12.6) Dates or time period in which research activity occurs.

12.7) Care and maintenance of live fish or eggs, holding duration, transport methods.

12.8) Expected type and effects of take and potential for injury or mortality.

12.9) Level of take of listed fish: number or range of fish handled, injured, or killed by sex, age, or size, if not already indicated in Section 2 and the attached "take table" (Table 1).

12.10) Alternative methods to achieve project objectives.

12.11) List species similar or related to the threatened species; provide number and causes of mortality related to this research project.

12.12) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse ecological effects, injury, or mortality to listed fish as a result of the proposed research activities.

SECTION 13. ATTACHMENTS AND CITATIONS

Freymond, Bill. June, 2000. Elwha/Dungeness Chinook Age Data. WDFW, Unpublished.

Piper, Robert, et. al., 1982, Fish Hatchery Management; United States Dept of Interior, Fish and Wildlife Service, Washington, DC.

Seidel, Paul, 1983, Spawning Guidelines for Washington Department of Fish and Wildlife Hatcheries, Washington Department of Fish and Wildlife, Olympia.

WDFW Chinook Run Reconstruction Data. 2000. WDFW Chinook Program, Olympia.

WDFW and Western Washington Tribes. December, 1994. 1992 Washington State Salmon and Steelhead Stock Inventory. WDFW.

Washington Department of Fisheries and Crown Zellerbach Corporation. April 25, 1975. Agreement Covering Contribution Toward Cost of Construction and Operation of Salmon Rearing Pond and Appurtenant Facilities on Elwha River.

Washington Department of Fish and Wildlife. 1996. Fish Health Manual. Hatcheries Program, Fish Health Division, Washington Department of Fish and Wildlife, Olympia.

Washington Department of Fish and Wildlife and Puget Sound Treaty Tribes, 2002, "Puget Sound Chinook Salmon Hatcheries, Resource Management Plan", a component of Comprehensive Chinook Salmon Management Plan, August 23, 2002. 103 pages.

SECTION 14. CERTIFICATION LANGUAGE AND SIGNATURE OF RESPONSIBLE PARTY

"I hereby certify that the foregoing information is complete, true and correct to the best of my knowledge and belief. I understand that the information provided in this HGMP is submitted for the purpose of receiving limits from take prohibitions specified under the Endangered Species Act of 1973 (16 U.S.C.1531-1543) and regulations promulgated thereafter for the proposed hatchery program, and that any false statement may subject me to the criminal penalties of 18 U.S.C. 1001, or penalties provided under the Endangered Species Act of 1973."

Name, Title, and Signature of Applicant:

Certified by_____ Date:_____

Table 1. Estimated listed salmonid take levels of by hatchery activity.

Listed species affected: Chinook ESU/Population:Elwha River Activity:_Hatchery Program				
Location of hatchery activity:_Elwha River, Hurd Creek, Sol Duc Hatchery Dates of activity:_August to June_ Hatchery program operator:_Don Rapleje				
Type of Take	**Annual Take of Listed Fish By Life Stage *(Number of Fish)***			
	Egg/Fry	Juvenile/Smolt	Adult	Carcass
Observe or harass a)				
Collect for transport b)				
Capture, handle, and release c)				
Capture, handle, tag/mark/tissue sample, and release d)				
Removal (e.g. broodstock) e)			up to 2,400	
Intentional lethal take f)			up to 2,400	
Unintentional lethal take g)	200,000 to 480,000 eggs	80,000 to 200,000 fish	5% to 30% of adults collected See note below **	
Other Take (specify) h)				

a. Contact with listed fish through stream surveys, carcass and mark recovery projects, or migrational delay at weirs.
b. Take associated with weir or trapping operations where listed fish are captured and transported for release.
c. Take associated with weir or trapping operations where listed fish are captured, handled and released upstream or downstream.
d. Take occurring due to tagging and/or bio-sampling of fish collected through trapping operations prior to upstream or downstream release, or through carcass recovery programs.
e. Listed fish removed from the wild and collected for use as broodstock.
f. Intentional mortality of listed fish, usually as a result of spawning as broodstock.
g. Unintentional mortality of listed fish, including loss of fish during transport or holding prior to spawning or prior to release into the wild, or, for integrated programs, mortalities during incubation and rearing.
h. Other takes not identified above as a category.

Note: ** The unintentional loss of adults is primarily related to the level of Dermocystidium(sp.) infection of the adults. In the past, the loss of adults trapped mirrored the loss of adults in the wild. Trapping does not appear to exacerbate the loss. In recent years the use of well water to hold adults has reduced to loss greatly to "normal" hatchery loss levels generally less than 5%.(see section 7.2)